

# Report



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| Subject  |     |            | Ref No.           |
| Revised assessment of health and environmental risks for Propidium Iodide and the reagent in DCC |     |            | M-0212-051E       |
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## 1 Background

Alfa Laval Materials has previously assessed the health and environmental risk for the reagent in the DCC, Report DM-0005-101 (Summary MDM-0007-009-E) and DM-0010-024-E. Due to changes in composition and uncertainties regarding the classification of Propidium Iodide (PI) a new assessment was asked for. In this report is also summarised some information that has been achieved regarding environmental considerations for the Propidium Iodide.

## 2 Assessment of health and environmental risk for DCC

### 2.1 Propidium Iodide

There had been changes regarding the classification, at the chemical supplier companies since last assessment, Report DM-0005-101. PI had previously been classified as R40 of Sigma-Aldrich. This was based on an American classification that is not valid today. According to Sigma-Aldrich there are very few tests performed on this product. The one that is found is not reliable to classify it as anything else than R36/37/38. Tests performed on bacteria are not included in the assessment of the toxicity of a product. Furthermore they tell that there is no data that indicates that PI should have any effect on the environment.

VWR had classified PI as R46, Mutagenic effects. When talking to them (2) they were doubtful about the classification and meant that it might be too severe. Nothing in their information from CN-Biocides confirms the classification to R46.

A new assessment of PI was performed by a toxicologist (3). The assessment leads to a new classification of PI, as R36/37/38. VWR has due to the new assessment upgraded their MSDS. The report from the toxicologist is in Appendix 2.

### 2.2 Classification of reagent in DCC

The new composition of the DCC reagent is listed in Table 1. The classification and CAS-number for the different ingredients is presented in Table 2.

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**Table 1. Composition of reagent in DCC.**

| Substance                 | Amount, g | Concentration, weight % | Concentration after drying, weight % |
|---------------------------|-----------|-------------------------|--------------------------------------|
| Propidium iodide          | 0,450     | 0,04                    | 0,27                                 |
| Triton X-100              | 75        | 7,5                     | 44,9                                 |
| Citric acid               | 12,5      | 1,2                     | 7,5                                  |
| Ammonium citrate          | 12,5      | 1,2                     | 7,5                                  |
| Ammonium chloride         | 66,5      | 6,6                     | 39,8                                 |
| Avjoniserat vatten        | 833,0     | 83,3                    | -                                    |
| <b>Total</b>              | 999,95    |                         |                                      |
| <b>Total after drying</b> | 166,95    |                         |                                      |

**Table 2. CAS-no and risk classes for ingredients in the reagent in DCC.**

| Substance               | CAS No.    | Risk class  |
|-------------------------|------------|-------------|
| Propidium iodide        | 25535-16-4 | R 36/37/38  |
| Triton X-100            | 9002-93-1  | R 22, 41    |
| Citric acid monohydrate | 5949-29-1  | R 41, 37/38 |
| Ammonium citrate        | 3012-65-5  | R 36/37/38  |
| Ammonium chloride       | 12125-02-9 | R22-36      |

The different risk classes is explained as following:

R22 Harmful if swallowed  
R36/37/38 Irritating to eye, respiratory system and skin  
R41 Risk of serious damage to eyes

According to the regulations of National Chemical Inspectorate, Sweden (Kemikalieinspektionen), KIFS 2001:3 solutions shall be classified considering the classification of the ingredients. At assessment of the solution according to general toxicity, the calculation gives that the solution shall be classified as R22, Harmful if swallowed. At assessment according to irritating properties, the calculation gives that it shall be classified as R41 Risk of serious damage to eyes. The reagent shall be classified as Harmful and irritating, X, with risk classes R22 and R41.

However in accordance to the previous assessment in report DM-0005-101, the reagent unit is judged as an article and the regulations regarding the environmental and health consideration is not obliged to follow.

### 3 Other environmental aspects

We tried to get an assumption of the input of PI to environment, due to the use of DCC, in relation to other user. However it was not possible to get any information about the yearly usage of PI worldwide neither from Sigma-Aldrich and VWR due to secrecy. However Sigma-Aldrich, Sweden had sold about 200 g last year. Type of customer is university that works with research and analysis. VWR had not sold any PI in Sweden during this year.



There have been discussions regarding the combustion of the DCC and its contribution to environmental impact. I have been in contact with IVF (Industrial Research and Development Corporation, Institutet för Verkstadsteknisk Forskning). Their advice is to do a LCA (Life cycle analysis) for the product in order to consider all-important environmental factors. Their opinion is that the CO<sub>2</sub>-gases from the combustion of the cassettes probably are not the main environmental factor. When calculating the environmental impact from the plastic, one part is from the production and another from the destruction (combustion). In this case it does not seem relevant to only calculate the impact from the combustion without considering the production. The web site [www.PRE.nl](http://www.PRE.nl) gives some data regarding this topic.

#### 4 Conclusion

Following main conclusions can be drawn:

- A new assessment of Propidium Iodide leads to the new classification R36/37/38, Irritating to eye, respiratory system and skin.
- The reagent mass in DCC shall be classified as Harmful, X, with risk classes R22 and R41.
- The reagent unit is judged as an article and the regulations regarding the environmental and health consideration is not obliged to follow.

#### 5 References

1. Sigma-Aldrich, Stockholm, Marie Olsson
2. VWR, Stockholm, *Siri Lindström*
3. EVEMA, Eva-Marie Nydahl, tel. 08-756 40 95
4. IVF, Anna-Karin Jönbrink